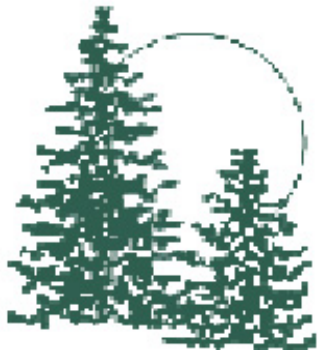


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REC Market Size and Challenges



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Many REC Markets

- Prices vary significantly
 - between compliance and voluntary markets
 - among regions
 - by resource type in voluntary markets, and in compliance markets if there are separate tiers or set-asides
- Some voluntary markets are regional (for rebundled RECs), other are national (for stand-alone RECs)

Compliance REC Prices

New England (all sources)

\$0.20 to \$51.50/MWh

New Jersey (class 1 and 2)

\$1.00 to \$3.50/MWh

New Jersey (solar)

\$170 to \$275/MWh

Texas (wind)

\$12.50 to \$13.25/MWh

Source: Evolution Markets (June 2005)

Factors affecting prices:

- Supply adequacy
- New vs. existing resources
- Resource type
- Resource “tiers”
- Geographic eligibility rules
- Banking and trading rules
- Level of non-compliance penalty

Voluntary REC Prices

New wind (CA, WA, WY)

\$1.00 to \$3.00/MWh

New biomass (ECAR)

\$3.50/MWh

New solar (CA)

\$30.00/MWh

Source: Evolution Markets (June 2005)

Factors affecting prices:

- Supply and demand
 - Competition from compliance markets
- Resource type and location
- New versus existing
- Volume purchased

Estimated REC Market Size and Value

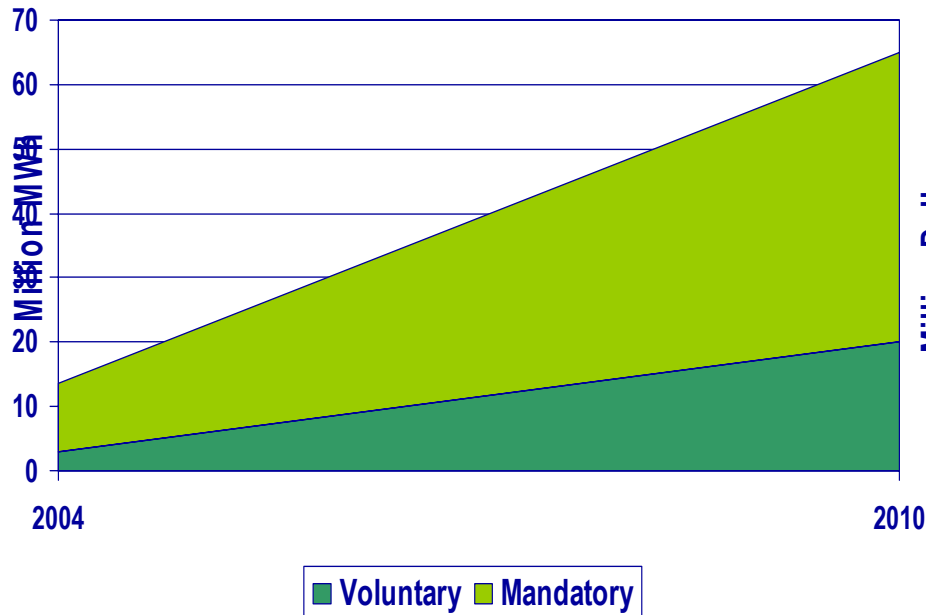
| | 2004 Size mill. MWh | 2004 Value \$millions | 2010 Size mill. MWh | 2010 Value \$millions |
|------------|------------------------|--------------------------|------------------------|--------------------------|
| Compliance | 8-13 | \$140 | 45 | \$600 |
| Voluntary | 3 | \$15-45 | 20 | \$100-300 |
| Total | 11-16 | \$155-185 | 65 | \$700-900 |

Ed Holt and Lori Bird, *Emerging Markets for Renewable Energy Certificates: Opportunities and Challenges*, NREL January 2005
<http://www.eere.energy.gov/greenpower/resources/pdfs/37388.pdf>

Growth of RECs Markets

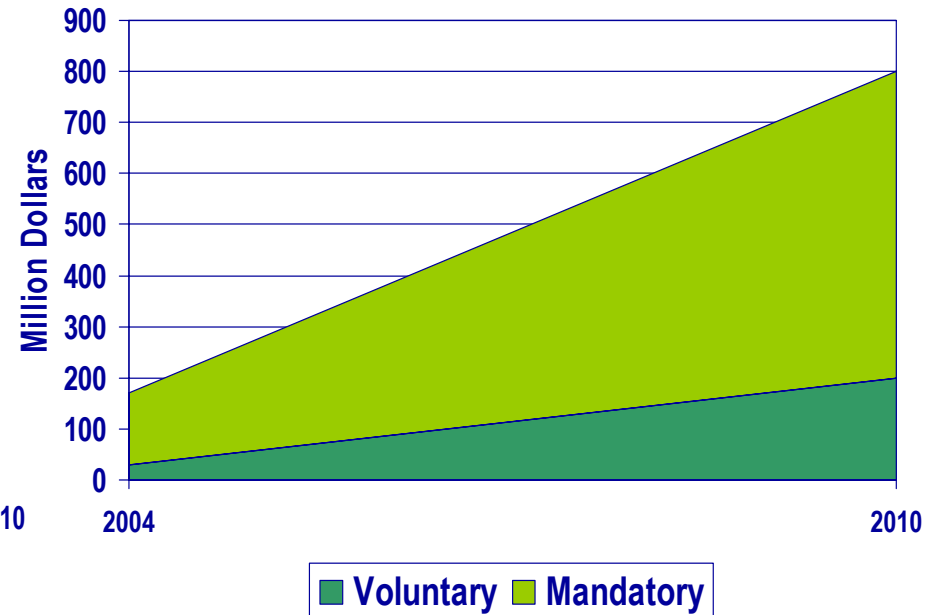
65 million MWh (7,420 aMW)

Quantity of Sales



\$700-\$900 million

Value of Sales



Key Issues and Challenges

- REC definition and environmental claims
- Barriers to national REC markets and liquidity
 - Greg Pool
 - Theresa Howland
- Development and coordination of REC tracking and verification systems
 - Meredith Wingate
- New models for community support
 - Larry Flowers
- Emissions market opportunities
- Using RECs to finance new projects
- REC ownership

REC Ownership Issues

- PURPA QF contracts
 - Most PURPA contracts do not specify REC ownership
 - FERC has ruled that avoided cost contracts do not automatically convey RECs, but left decision to states
 - Most states have not addressed this issue
- Net metering
 - Most net metering rules are silent on REC ownership
- State or utility-subsidized systems
 - Some state RE funds or utilities have required transfer of all or some portion of the RECs in return for providing financial incentives

PURPA QF Contracts

- States with RPS feel pressure to grant RECs from QFs to utilities purchasing power
 - Lowers the cost of RPS compliance
 - ME, CT, NJ, NM, NV?
 - Exception is TX, but most contracts convey RECs
- Several states are in the midst of proceedings
 - CA, CO, PA, ND, UT
 - OR PUC staff recommended QFs retain RECs

Net Metering

- NJ: customer owns the RECs
- MI: PUC rejected proposal that utilities would get the RECs and share back some of the revenue with customer-generators
- MN: a utility under obligation to acquire RE gets the RECs but must pay the full avoided cost of green power
- NV: customer gets RECs for energy consumed on-site, and because of RPS, utility gets RECs from net excess generation
- MD: another RPS state, customers retain RECs in excess of the % required by their electricity suppliers
 - e.g., if 2% RPS, suppliers get 2% of RECs from energy generated and consumed on-site
- Under consideration: CA, DC, PA, OR
- Federal net metering provision is opportunity to consider

Financial Incentives

- WA: RECs belong to customer
- CT: changed position, now RECs belong to customer
- OR: Energy Trust gets RECs proportionate to level of funding
- NV: utility gets all RECs from PV program
- Austin: utility gets all RECs from PV program
- Under consideration: MN (C-BED), CO (proposal that utilities get RECs but have to pay for them in addition to PV buy-down)

Conclusions

- RPS is driving consideration of REC ownership in most states
- PUCs generally want to mitigate cost of RPS compliance, and do so by awarding QF RECs to utilities
- No clear trend on owning RECs from net metering
 - Some PUCs trying to balance encouragement for customer on-site generation vs. lower RPS compliance cost for utilities
- Policies for projects receiving financial incentives are mixed, and send a mixed message
 - What is given with one hand may be taken away by the other